Claims:

1. A switching power supply circuit, comprising:

a rectification smoothing section for receiving an AC voltage as an input thereto and performing rectification smoothing operation for the AC voltage to produce a rectified smoothed voltage;

a switching section including a plurality of switching elements for interrupting the rectified smoothed voltage outputted from said rectification smoothing section;

a driving section for driving said switching elements to switch in a switching frequency determined in advance;

a converter transformer including a primary winding and a secondary winding wound divisionally on a core having a magnetic leg having a gap formed therein such that said primary winding and said secondary winding have a loose coupling state with a coupling coefficient equal to or lower than a required value and have numbers of turns set so that an induced voltage per one turn of said secondary winding is equal to or lower than a predetermined level, an output of said switching section obtained at said primary winding being transmitted to said secondary winding;

a primary side series resonance circuit formed at least from a leakage inductance component of said primary winding of said converter transformer and a capacitance of a primary side series resonance capacitor connected in series to said primary winding for making operation of said switching section as that of the current resonance type;

a primary side partial voltage resonance circuit formed from a capacitance of a primary side partial voltage resonance capacitor connected in parallel to a predetermined one of said switching elements which form said switching section and a leakage inductance component of said primary winding of said converter transformer for performing partial voltage resonance operation only within a turnoff period of the switching element which forms said switching section; and

a DC output voltage production section for receiving an alternating voltage obtained at said secondary winding of said converter transformer as an input thereto and performing rectification and smoothing for the inputted alternating voltage to produce a secondary side DC output voltage;

the numbers of turns of said primary winding and said secondary winding being selected such that the

induced voltage per one turn of said secondary winding is set to a voltage with which secondary side current to flow through said secondary winding flows continuously.

2. A switching power supply circuit according to claim 1, further comprising:

a constant voltage control section for controlling said driving section in response to a level of the secondary side DC output voltage to vary the switching frequency with which said switching elements are to be driven to switch thereby to perform constant voltage control for the secondary side DC output voltage.

3. A switching power supply circuit according to claim 1, further comprising:

a secondary side partial voltage resonance circuit formed from a capacitance of a secondary side partial voltage resonance capacitor connected in parallel to said secondary winding of said converter transformer and a leakage inductance component of said secondary winding for performing partial resonance operation on the secondary side.

4. A switching power supply circuit, comprising:

a rectification smoothing section for receiving an AC voltage as an input thereto and performing rectification smoothing operation for the AC voltage to

produce a rectified smoothed voltage;

a switching section including a plurality of switching elements for interrupting the rectified smoothed voltage outputted from said rectification smoothing section;

a driving section for driving said switching elements to switch in a switching frequency determined in advance;

a converter transformer including a primary winding and a secondary winding wound divisionally on a core having a magnetic leg having a gap formed therein such that said primary winding and said secondary winding have a loose coupling state with a coupling coefficient equal to or lower than a required value and have numbers of turns set so that an induced voltage per one turn of said secondary winding is equal to or higher than a predetermined level, an output of said switching section obtained at said primary winding being transmitted to said secondary winding;

a primary side series resonance circuit formed at least from a leakage inductance component of said primary winding of said converter transformer and a capacitance of a primary side series resonance capacitor connected in series to said primary winding for making operation of

said switching section as that of the current resonance type;

a primary side partial voltage resonance circuit formed from a capacitance of a primary side partial voltage resonance capacitor connected in parallel to a predetermined one of said switching elements which form said switching section and a leakage inductance component of said primary winding of said insulating converter transformer for performing partial voltage resonance operation only within a turnoff period of the switching element which forms said switching section;

a DC output voltage production section for receiving an alternating voltage obtained at said secondary winding of said converter transformer as an input thereto and performing rectification and smoothing for the inputted alternating voltage to produce a secondary side DC output voltage; and

a secondary side partial voltage resonance circuit formed from a capacitance of a secondary side partial voltage resonance capacitor connected in parallel to said secondary winding of said converter transformer and a leakage inductance component of said secondary winding for performing partial resonance operation on the secondary side;

the numbers of turns of said primary winding and said secondary winding being selected such that the induced voltage per one turn of said secondary winding is set to a voltage with which secondary side current to flow through said secondary winding does not flow continuously.

5. A switching power supply circuit according to claim 4, further comprising:

a constant voltage control section for controlling said driving section in response to a level of the secondary side DC output voltage to vary the switching frequency with which said switching elements are to be driven to switch thereby to perform constant voltage control for the secondary side DC output voltage.

6. A switching power supply circuit according to claim 1 or 4, wherein said plurality of switching elements of said switching section are two switching elements connected in series between the rectified smoothed voltage and a reference potential, and said two switching elements are driven to perform switching operation alternately by said driving section.

7. A switching power supply circuit according to claim 1 or 4, wherein said plurality of switching elements of said switching section are two sets of two

switching elements connected in series between the rectified smoothed voltage and a reference potential, and said two sets of the two switching elements are driven to perform switching operation alternately by said driving section.

8. A switching power supply circuit according to claim 1 or 4, wherein said driving section is a driving resonance circuit which includes a driving coil and a driving resonance capacitor connected in series to said driving coil and has a switching frequency based on a resonance frequency determined by an inductance component of said driving winding and a capacitance of said driving resonance capacitor.

9. A switching power supply circuit according to claim 2 or 5, wherein a driving coil of said driving section is a driving winding of an orthogonal control transformer connected in series to said primary side series resonance capacitor, and said orthogonal control transformer is a saturable rector which includes said driving winding, a detection winding connected in series to said primary winding and said primary side series resonance capacitor, and a control winding wound in an orthogonal direction to said driving winding and said detection winding for being supplied with control current

of a level corresponding to a variation of a level of the secondary side DC output voltage.

10. A switching power supply circuit according to claim 1 or 4, wherein a center tap connected to a reference potential is provided at a central portion of said secondary winding of said converter transformer, and a rectifier and a smoothing capacitor are provided at each of the opposite end portions of said secondary winding so that full-wave rectification is performed.